Whether it be heated rain-water, or heated sea-water containing silica, the principle of the transmutation is the same.

These siliceous beds are found, not only in the marine Silurian (and possibly older) beds of tropical Australia, in which sponges are comparatively rare, and in the Carboniferous rocks, but also in a fresh-water deposit which caps a hill south of Mount Elder on the Ord River, and about 500 feet above the level of the country, showing that it must at one time have been the bed of a very extensive lake. The upper beds are white limestone merging upwards as usual into flint, calcedony, and green agates. These are 50 feet thick, and all abound in a fossil, *Planorbis*, as determined by Professor McCoy, of Melbourne University, who named it as a new species, *Planorbis Hardmani*. His decision was confirmed by R. Etheridge, Junr., and Dr. Woodward, and the specimens are at present in the Museum at South Kensington.

This rock is simply one mass of *Planorbis* shells all highly silicified. I can hardly conceive that it was formed from sponge spicules, especially as according to Ernst Haeckel ('History of Creation,' p. 139) the main class of the Sponges lives in the sea, with the single exception of the green fresh-water Sponge (*Spongilla*).

It is not probable then that these organisms would have existed in these regions in sufficient numbers to form a rock 50 feet thick and over two miles square at present.

We have therefore examples at both ends of the scale in this one country showing how improbable is the Sponge theory of chert.

III. "On the Homologies and Succession of the Teeth in the Dasyuridæ, with an Attempt to trace the History of the Evolution of Mammalian Teeth in general." By Oldfield Thomas, British Museum (Natural History). Communicated by Dr. Albert Günther, F.R.S. Received April 4, 1887.

(Abstract.)

The true homologies of the different teeth in the Marsupialia, and especially in the *Dasyuridæ*, have long been in a state of confusion, largely owing to their perplexing superficial resemblances to the teeth of the Carnivora and other Placentals, and to the incorrect homologies thereon founded. This confusion has been chiefly in regard to the premolars, of which some members of the family have two, others three, while generalised Placentals have four, and it is therefore necessary to prove which teeth have been successively lost in order to find out the correct homologies of the remainder.

Firstly, as to which of the three premolars of such genera as *Thylacinus* and *Phascologale* have been lost in *Dasyurus* and *Sarcophilus*, each with only two—a study of the different members of the genus *Phascologale* shows that, judging by the great variability in size of the last premolar or pm.^{4} of the typical mammalian dentition,* which is sometimes even altogether aborted, it is this tooth that is the one lost in *Dasyurus* and *Sarcophilus*, the total loss of the changing tooth naturally accounting for the non-discovery of a tooth-change in these genera.

Next, since the original number of premolars was clearly four in the Marsupials as well as in the Placentals, it was necessary to find out which of these had disappeared in the ordinary three-toothed genera of the Polyprotodonts, and this has been able to be done by the fortunate discovery of a specimen of *Phascologale* in which there are four premolars on one side, the additional tooth being inserted between the ordinary first and second premolars. The missing premolar is therefore pm.^{2}, as shown both by this instance and by the relative positions of the teeth in other Polyprotodonts, the resulting premolar formula of *Phascologale* and *Thylacinus* being P.M. $\frac{1.0.3.4}{1.0.3.4}$ and of *Dasyurus* and *Sarcophilus* P.M. $\frac{1.0.3.0}{1.0.3.0}$.†

The milk dentition in several of the *Dasyuridæ* is then described, among others that of the Purbeck Mesozoic Marsupial *Triacanthodon serrula* (Owen), which is proved to have, as had been suggested by Professors Owen and Flower, a milk dentition identical with that of the modern Marsupials.

An attempt is then made to trace out the history of the evolution of mammalian teeth in general, and as a preliminary it is insisted (1) that the rudimentary tooth-change of the Marsupials is not a remnant of a fuller one, but a low and early stage in the development of complete diphyodontism, a stage out of which the Eutheria have long ago passed; and (2) that, as maintained by Professor Flower, the milk teeth are the superadded and not the primary set.

It is then suggested that the process by which a milk tooth was developed consisted of two stages, firstly, a preliminary retardation of the permanent tooth, and secondly, of the development of a temporary tooth in the gap in the tooth-row caused thereby; the retardation in the first case being useful for packing purposes in a large-toothed

* Although the homology of this tooth with the pm.^{4} of Placentals, first made out by Professor Flower, has been called in question, there can be no doubt that it is entirely correct.

† This method of writing dental formulæ is recommended as showing not only the total number, but the homologies of the teeth, each of which has its own number in the series.

animal, while in a small-toothed form the same retardation, if present by inheritance, would cause a more or less disadvantageous gap, best filled by the assumption of a milk tooth.

The first stage, or stage of retardation, appears to be still represented in the anterior upper incisors of many Polyprotodont Marsupials, and it is therefore believed that these teeth now represent the stage at which the ancestors of the Marsupials and Eutheria diverged from one another, a stage at which the further development of milk incisors was just commencing.

Following out this idea, it is shown how easily the transition from the Metatherian to the Eutherian stage of tooth-change may have taken place, a transition by the help of which a complete series of diagrams can be drawn up, following the history of each individual tooth, from the dentition of the earliest Mammals, homodont and monophyodont, as no doubt the unmodified Prototheria were, down to the varied forms of dentition, heterodont and diphyodont, existing at the present day.

All the orders of Mammalia fall easily enough into their places in the main line of this scheme with one exception, namely, the Edentata, in whose case the evidence all tends to prove the correctness of Professor Parker's suggestion as to their nearly direct derivation from the Prototheria, a suggestion that the characters of their teeth most fully support. On the same principles, therefore, as the main Proto-meta-eutherian line of tooth development is drawn up, a side branch, for which the name "Paratherian" is suggested, is made for the Edentates. Within that branch very little heterodontism has ever been developed, but otherwise the changes, except in the case of the as yet inexplicable dentition of *Orycteropus* have been of the same nature as those in the main line, the superaddition of a milk set of teeth in *Tatusia* being, as in the Meta- and Eu-theria, the last and most highly specialised development.

IV. "Note on Protection in Anthrax." By L. C. Wooldridge, M.D., D.Sc., Demonstrator of Physiology, Guy's Hospital. Communicated by E. Klein, M.D., F.R.S. Received April 16, 1887.

Hitherto in the few cases in which protection against zymotic disease has been found possible, it has been effected by the communication to the animal of a modified form of the disease against which protection is sought.

I have succeeded in protecting rabbits from anthrax by an altogether different process, and although this is scarcely, at present, of practical utility, it may perhaps be found to be of some interest as